

This list of claims will replace all prior versions and listings of claims in this application.

LISTING OF THE CLAIMS

1. (Currently Amended) A method of ~~detecting~~, characterising or monitoring a hydrocarbon zone, comprising, performing genotypic analysis on a sample for the presence of one or more thermophilic or extremophilic microorganisms, wherein the presence or absence of said one or more thermophilic or extremophilic microorganisms indicates ~~(1) the presence or absence of a hydrocarbon zone or (2) the properties of the hydrocarbon zone; and wherein monitoring further comprises comparing~~ the properties of the hydrocarbon zone in the sample relative to the properties of the hydrocarbon zone in prior or subsequent samples ~~identifies to identify~~ changes in the hydrocarbon zone.

2. (Currently Amended) [[A]] The method ~~as claimed in~~ of claim 1 wherein the sample is from a sub-surface formation.

3. (Currently Amended) [[A]] The method ~~as claimed in~~ of claim 1 wherein the sample is oil, water or an oil/water mixture from an exploration or production well.

4. (Currently Amended) [[A]] The method ~~as claimed in~~ of claim 1 wherein the sample is oil or water that has been exposed to oil.

5. (Currently Amended) [[A]] The method ~~as claimed in~~ of claim 1 wherein information regarding the microorganisms present is utilized in an ongoing exploration or production process.

6. (Currently Amended) [[A]] The method ~~as claimed in~~ of claim 1 wherein a plurality of different microorganisms are detected thereby generating a microbiological profile for said sample.

7. (Currently Amended) [[A]] The method ~~as claimed in~~ of claim 6 wherein the generated microbiological profile is compared against one or more reference profiles.

8. (Currently Amended) [[A]] The method as claimed in of claim 1 wherein the sample is analyzed for the presence of *Archaeoglobus*, *Erythrobacter*, *Arcobacter*, *Geothermobacter*, *Thermodesulforamona*_s, and *Thermotogales*.

9. (Currently Amended) [[A]] The method as claimed in of claim 1 which does not comprise a culturing step.

10. (Currently Amended) [[A]] The method as claimed in of claim 1 wherein the sample is contacted with one or more different oligonucleotides designed to hybridise to regions of nucleic acid from or derived from the thermophilic or extremophilic microorganisms.

11. (Currently Amended) [[A]] The method as claimed in of claim 1 wherein nucleic acid from or derived from the thermophilic or extremophilic microorganisms within the sample is amplified.

12. (Currently Amended) [[A]] The method as claimed in of claim 1 wherein the hydrocarbon zone is characterized such that information about the type of oil, the quantity of oil, the quality of the oil, the sulphur content of the oil, the presence of gas or the gas:oil ratio is obtained.

13. (Currently Amended) [[A]] The method as claimed in of claim 1 wherein the hydrocarbon zone is characterized such that the depth of a hydrocarbon zone is determined, wherein the particular microorganisms identified are indicative of a certain depth.

14. (Currently Amended) [[A]] The method as claimed in of claim 1 wherein the hydrocarbon zone is characterized such that the migration route of said hydrocarbon zone is determined.

15. (Currently Amended) [[A]] The method as claimed in of claim 13 wherein the hydrocarbon zone is an oil reservoir.

16. (Currently Amended) [[A]] The method ~~as claimed in~~ of claim 1 wherein genotypic analysis is performed using one or more probes of SEQ ID No. 1 to SEQ ID No. 19, wherein at least one probe is SEQ ID No. 1.

17. (Withdrawn) The use of one or more oligonucleotide probes preferably a battery of probes in the generation of a microbiological profile of a sample as defined in claim 2, wherein said profile is for detecting, characterizing or monitoring a hydrocarbon zone.

18. (Withdrawn) The use of claim 17 wherein said microbiological profile is a pattern which can be compared with a reference sample.

19. (Withdrawn) A battery of probes for use in the method of claim 1.

20. (Withdrawn) An oligonucleotide as defined in any one of SEQ ID No. 5 to SEQ ID No. 19 or a functionally equivalent variant thereof.

21. (Withdrawn) A solid support having attached thereto one or more oligonucleotides as defined in claim 20.

22. (Withdrawn) A solid support as claimed in claim 21 which is a microchip.

23. (Withdrawn) A solid support having attached thereto one or more oligonucleotides as defined any one of SEQ ID No. 5 to SEQ ID No. 19 or a functionally equivalent variant thereof, wherein the sold support has at least 4 oligonucleotides attached thereto.

24. (Withdrawn) A kit for use in a method as claimed in claim 1 comprising one or more oligonucleotides as defined in any one of SEQ ID No. 5 to SEQ ID No. 19 or a functionally equivalent variant thereof.